

SECTION 19**EARTHWORK****19-1 GENERAL**

Earthwork shall conform to Section 19 of the Caltrans Standard Specifications and these City Standard Specifications.

19-1.01 Description. - Earthwork for drainage and sewer facilities is specified in Section 1301 of these City Standard Specifications. Subgrade preparation shall conform to Section 21 of these City Standard Specifications. Delete all subgrade preparation provisions in Section 19 of the Caltrans Standard Specifications.

Earthwork shall include all excavation, compaction, and other earthwork performed on the project site, as indicated in the plans or special provisions. In general, references to the "roadway prism" or "roadway facilities" or "roadway" or "highway" shall be construed as references to the project or project site, as applicable and except as otherwise indicated in these specifications.

19-2 ROADWAY EXCAVATION

19-2.01 Description. - This work shall conform to Section 19-2 of the Caltrans Standard Specifications, except that all references to "roadway" shall be construed as references to roadways and other pavement facilities.

Excavation shall be performed as indicated on the plans to the lines, grades, and elevations shown. All deleterious materials encountered within the limits indicated shall be removed and disposed of.

The rough excavation shall be carried to a depth necessary to allow for compacting the basement material to the requirements as specified and to the planned cross section of the grading plane.

The Contractor may use any type of earth-moving equipment or any type of compaction equipment, provided the equipment is in satisfactory condition and is capable of performing the work within the time schedule of the project.

During the process of excavation, the grade shall be maintained so that it will be well drained at all times. When so directed, Contractor shall install temporary drains and drainage ditches to intercept or divert surface water which may affect the work.

19-2.05 Slopes. - When completed, slopes and shoulders shall present a neat and uniform appearance.

19-2.07 Selected Material. - Topsoil excavated within the limits of the project shall be stockpiled for use in areas to be planted or landscaped, and shall not be used for any other purpose until no further topsoil is required for landscape purposes. Any remaining topsoil may then be used as specified for selected material.

Selected material designated for use as backfill for areas to be landscaped shall conform to Section 20-2.01, "Soil," except the soil need not be surface soil.

19-3 STRUCTURE EXCAVATION AND BACKFILL

19-3.01 Description. - Trenches or foundation pits for structures or structure footings shall be excavated to the lines and grades or elevations shown on the plans or as staked by the Engineer. Trenches or pits shall be of sufficient size to permit the placing of structures or structure footing of the width and length shown on the plans. Any elevation, as shown on the plans, of the bottoms of footings shall be considered as approximate only and the Engineer may order in writing such changes in dimensions or elevations of footings as may be necessary to secure a satisfactory foundation.

19-3.03 Cofferdams. - Cofferdams shall be used whenever water-bearing strata are encountered above the elevation of the bottom of the excavation.

Cross struts or bracing used in cofferdam construction which extend through foundation concrete both above and below low water shall be removed upon completion of footing pouring or when cofferdam is no longer necessary, and the resulting space filled with concrete of the same mix as that specified for the surrounding concrete.

19-3.04 Water Control and Foundation Treatment. - All loose and displaced material resulting from the driving of piles shall be removed.

19-3.06 Structure Backfill. - Material for structure backfill shall be soil selected from structural excavation insofar as such material is readily compactible and conforms to the requirements of this section.

Structure backfill shall be free from stones and lumps exceeding 3 inches in greatest dimension, vegetable matter, or other unsatisfactory material. If satisfactory material for use as structure backfill cannot be obtained from excavation, suitable imported material, approved by the Engineer, shall be furnished by the Contractor, at his expense.

Material from excavation that is determined by the Engineer to be unsuitable for use as backfill shall be disposed of.

19-3.065 Pervious Backfill Material. - Sieve analysis of mineral aggregate to be used as pervious backfill will be tested in accordance with California Test 202.

That portion of pervious backfill material passing the No. 4 sieve shall have a sand equivalent of not less than 60, as determined in accordance with California Test 217.

Filter material for wall drain outlets shall consist of burlap sacks, each containing approximately one cubic foot of specified material. One sack shall be placed behind each wall drain outlet, along with the pervious material backfill.

19-3.066 Permeable Backfill Material. - Where shown on the plans, areas to receive permeable material blankets shall be graded to the lines and grades as shown on the plans.

Minimum durability index shall be 40, when tested in accordance with California Test No. 229. Minimum Sand Equivalent of permeable materials shall be 75 when tested in accordance with California Test 217. Original has no test value.

19-5 COMPACTION

19-5.02 General. - For areas greater than 100 square feet on fill, the provisions of Section 19-6, "Embankment Construction," shall apply. In addition to the density required, the subgrade shall be stable and unyielding.

Any portion of the area which is not accessible to standard compacting equipment shall be compacted to the required density by approved mechanical tamper.

All irregularities or depressions that develop under compacting or rolling equipment shall be corrected by adding, removing, or replacing material until the surface is smooth, uniform and unyielding.

All soft and yielding material and material which will not compact readily when rolled or tamped shall be removed as directed by the Engineer and replaced with suitable material.

19-5.03 Relative Compaction (95 Percent). - On areas to be paved, the finished subgrade (basement grade) shall be compacted to a density of not less than 95 percent for a depth of 0.5 foot in accordance with California Test No. 231.

The required relative compaction for paved areas of 95 percent to a minimum depth of 2.5 feet below finished grade applies to embankment fills in excess of 3 feet from the original ground surface. For embankment fills less than 3 feet in height, the relative compaction of not less than 95 percent shall be obtained for the complete depth of the embankment, including 0.5 foot below the original ground surface.

All embankment lifts not otherwise specified in this Section, and composed of noncohesive (granular) soils, shall have a relative compaction of not less than 95 percent.

19-5.04 Relative Compaction (90 Percent). - If a portion of an area to be paved is on a local filled area, the material shall be compacted to a density of 90 percent to within 0.5 foot of the subgrade and 95 percent thereafter to finished subgrade.

19-5.05 Foundation Preparation. - No payment will be made for suitable materials removed, manipulated, and replaced in order to obtain density. Any removal, manipulation, aeration, replacement, or recompaction of suitable materials necessary to obtain the required density shall be considered as incidental to the excavation.

19-6 EMBANKMENT CONSTRUCTION

19-6.01 Placing. - Before placing fill material upon any area, clearing and grubbing shall have been accomplished in accordance with the provisions of Section 16, "Clearing and Grubbing." All depressions or holes below the ground surface, whether caused by grubbing or otherwise, shall be backfilled with suitable material and compacted prior to the construction of embankments. Objectionable material shall not be allowed in or under the embankment.

The entire area upon which the embankment is to be placed shall be scarified, plowed, or broken up in such manner that the fill material will blend with the existing surface. Any objectionable material that would cause interference with the compaction of the fill shall be removed and disposed of.

When embankments are to be constructed upon an existing paved surface, the pavement shall be scarified to its full depth and broken up so that no piece larger than 1 foot in greatest dimension shall remain. The broken pieces shall be thoroughly mixed with fill material so that no pockets of broken pavement exist.

The loose thickness of each layer of embankment fill material shall not exceed 0.67 foot for the full width of cross section.

Clods or hard lumps of earth over 0.5 foot in greatest dimension shall be broken up before compacting the embankment material, except as otherwise provided in Section 19-6.01 of the Caltrans Standard Specifications.

When embankment construction requires cutting a minimum 6-foot horizontal bench into existing slopes, as specified in Section 19-6.01 of the Caltrans Standard Specifications, a new bench shall be started where the vertical cut for the next lower bench intersects the existing ground.

19-6.025 Settlement Period. - Any embankment for which a settlement period is provided in the special provisions, shall remain in place for the required settlement period before excavating for any designated improvements.

Where an embankment settlement period is specified, the embankment fill shall be constructed to the lines, grades and to the limits shown on the plans or specified in the special provisions.

Settlement platforms and instruments connected therewith shall be protected by the Contractor for the length of the settlement period.